

REMARKS

This Amendment is in response to the Office Action mailed on October 8, 2003. Claims 1-85 were pending and the Examiner rejected all claims. With this amendment the Specification is amended, claim 1 is amended and the remaining claims remain unchanged. Reconsideration and allowance of claims 1-85 are respectfully requested in view of the following remarks.

On page 2 of the Office Action the Examiner requested that the Applicant resubmit the 1449 forms that were originally submitted with the Information Disclosure Statement. The Examiner indicated that these forms had been lost from the file, but that the references contained on them had been considered. In response to the Examiner's request, the Applicant is submitting with this response copies of the 1449 forms that were originally filed.

In item 1 and 2 of the Office Action the Examiner requested new drawings in the application as the present drawings were informal. In response, the Applicant is submitting formal drawings with this Amendment. Further, the formal drawings include the labeling of the number "370" for the wire as requested by the Examiner. Reconsideration and withdrawal of the rejection are respectfully requested.

In item 3 the Examiner objected to the use of the word "teflon" as presented in the Specification. In response, the Specification is amended to capitalize the word "Teflon" wherever it occurs in the Specification. Further, all occurrences of the word "Teflon" are accompanied by a generic description. Reconsideration and withdrawal of the objection are respectfully requested.

On page 3 of the Office Action the Examiner rejected all claims under 35 USC §103(a) as being anticipated by Dumoulin et al. (U.S. Patent No. 6,246,896) in view of Minkoff et al. (WO 98/52461). The Examiner indicated that Dumoulin et al. taught all of the features of the instant invention including a tracking NMR coil for providing positional information of the surgical catheter of interest which also delivers RF current to treat the area of interest, while the MRI system acquires image data of the area of interest which depicts on the MRI image the location of the tracking coil. The Examiner noted that Dumoulin et al. does not teach the use of the tracking NMR coil which provides a first image of the patient's internal area of interest used to enhance

the acquired MRI image. The Examiner asserted that Minkoff et al., being in the same field of endeavor, teaches the use of an internally derived image of the proximate area of interest near the catheter being combinable with an externally derived image in order to combine the two and provide an enhanced image. The Examiner then asserted that it would have been obvious to one of ordinary skill in the art to combine the references to obtain the Applicants inventions. The Applicant has reviewed the cited references and must respectfully disagree.

Dumoulin et al. teach a catheter for ablating an occlusion in an artery. The system of Dumoulin et al. also includes an MRI system for acquiring image data from the patient being treated, and for acquiring NMR tracking data from the catheter. However, the Dumoulin et al. reference does not provide an image of the interior of the vessel to be recannalized. The Examiner indicated that to obtain this image portion it would have been obvious to use the teachings of the Minkoff et al. reference.

The Minkoff et al. reference discloses a method of imaging a vessel of the heart. The Minkoff et al. reference places an imaging device down the esophagus of the patient, and attempts to manipulate the device as close to the artery or vessel of interest as is possible. An image of the artery is generated by MRI, and used to determine the level and type of the occlusion in the artery. However, this image is not generated in the actual artery or vessel to be recannalized. Further, the Examiner indicated that the motivation to combine the references was to increase the signal to noise ratio (SNR) by imaging both internally and externally. However, the cited passage on page 5 of the Minkoff reference merely indicates that it is possible to obtain higher SNR than using an external coil, but does not provide a suggestion or motivation to use the image while recanalizing a vessel.

If one were to combine the Dumoulin et al. reference with Minkoff et al. reference as suggested by the Examiner, the result would require the use of two catheters to obtain the image of the vessels and to recannalize the vessel. The first catheter would be placed as close to the occluded vessel as possible from the esophagus, without entering the vessel. Next a second catheter is inserted, and navigated to the occluded area of the vessel of interest. Based on the

images derived from the first catheter, the occluded vessel would be ablated, thus increasing the flow rate and reducing pressure in the vessel. However, this combination does not result in the invention set out in the claims of the present invention.


Specifically, claim 1, as amended, requires that the image of the occluded vessel is generated from within the substantially totally occluded vessel. The internal RF antenna is adapted to be positioned in the occluded vessel proximate the occlusion, to receive RF signals emitted from the subject in response to the RF pulses and to provide an output signal in response to the received signals. Recanalization of a totally occluded vessel is a difficult task because visualization of the totally occluded vessel is very difficult. In one illustrative embodiment of the present invention, the internal antenna is integral with equipment deployed in the vessel to assist in the delivery of the recanalization device 300 to the occlusion, such as a catheter 340, as shown in FIG. 3, or a guidewire. However, in an alternative embodiment, the internal antenna is integral with the recanalization device 330. See page 13 lines 18-23. By placing the antenna in the occluded vessel it is possible to image the occluded vessel from within, as opposed to from an area outside the occluded vessel, as taught by the cited references. Further, claim 60 requires that the antenna provides an output signal and is "positioned in the occluded vessel proximate the occlusion." As discussed above, neither the Dumoulin et al. reference nor the Minkoff et al. reference taken singly or in combination teach or suggest imaging the occluded vessel from within the occluded vessel. Therefore, it is believed that independent claims 1 and 60 are allowable over Dumoulin et al. in view of Minkoff et al. Furthermore, dependent claims 2-59 and 61-85 are believed allowable as well by virtue of their dependency either directly from independent claim 1 or 60. Reconsideration and withdrawal of the rejection are respectfully requested.

In conclusion, it is believed that claims 1-85 are allowable over the prior art of record, because none of the prior art of record teaches or suggests ablating/recannalization and imaging the occlusion from within the occluded vessel. Reconsideration and allowance of claims 1-85 are respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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